

Crash Science: Distracted Driving activity

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Key question: How do different distractions affect your time to complete a task?

Materials: (for groups of 3-4 students)

- Touch Track #1 (1)
- Touch Track #2 (1)
- Stopwatch (1)
- Visual Distractors (i.e., magazine photos, playing cards, textbook photos, calculator, hand mirror)
- Auditory Distractors (i.e., textbook, trade books or novels)
- Manual Distractors (i.e., mixture of Chex-Mix and M&Ms, or mixture of nuts, bolts, washers, or pennies and nickels)
- Cognitive Distractors (see below for Mental-Math problems)
- Paper bowls for Manual distractors (2)
- Small zip-lock plastic bags for distractor supplies (3) (i.e., photos, Chex-Mix mixture, math problems paper strips)
- Optional: "All the Above" Distractor
 - 1 small calculator
 - Calculator-Math problems (provided below)

Preparations:

Make copies of Touch Tracks #1 and #2. Gather smaller distractors and sort into small zip-lock bags. For Visual Distractors, if using magazine photos, cut 8-10 photos per group. Laminating photos is suggested. For Manual Distractors, if using Chex-Mix and M&Ms, pour mixture into zip-lock bags. Putting some M&Ms aside to give students at end of activity is recommended. For Cognitive Distractors, copy one set of Mental Math addition problems per group then cut each set into strips and place each set in a zip-lock baggie. For "All the Above" Distractors, copy one set of Calculator-Math problems per group then cut each set and place each set in a zip-lock bag. Put small calculators with Calculator-Math problems. Calculators should be small enough for students to hold with one hand.

Procedure:

1. Engage - Show clip from Stop Texting website (www.StopTextStopWrecks.org). Inform students that texting is only one example of a driving distraction. Ask students to help you list other driving distractions (see below for examples of other driving distractions).

Examples of driving distractions:

- Texting
- Using a cell phone or smart-phone
- Eating and drinking
- Talking to passengers
- Grooming
- Reading, including maps
- Using a navigation system
- Watching a video
- Adjusting a radio, CD player, or MP3 player

2. Introduce activity and state key question: “In today’s activity, we will investigate your ability to conduct a task while distracted.”

Key question: How do different distractions affect your time to complete a task?

3. Explore

- a. Place students in groups of three or four. If using groups of three, combine Checker and Timer roles.
- b. Explain roles for group members. Students alternate roles after each trial.
 - i. “Driver” - performs Touch Track by touching all numbers in the correct sequence using their index finger.
 - ii. Distractor - administers distractions (see descriptions below)
 - iii. Checker - watches “Driver” to ensure they touch numbers in correct sequence
 - iv. Timer – measures elapsed time for “Driver” to touch numbers in correct sequence
- c. Students may conduct a **practice run with the Touch Track #1**.
- d. Use **Touch Track #2** for the actual investigation time trials (see Student Data Sheet).
 - i. First, ask groups to measure and record “Driver’s” times to complete Touch Track #2 **without distractions**.
 - ii. Next, ask groups to measure and record “Driver’s” times to complete Touch Track #2 with at least two of the four types of distractions (see descriptions below).
- e. If time allows, have groups complete multiple trials for each distraction type and average trials.

4. Analyze and Discuss

- a. Have students review their data to rank the difficulty of the sensory distractions from easiest to hardest. Most students find the Auditory distraction the easiest and the fourth combined distraction simulating texting with the calculator the hardest.
- b. If time allows or for homework, ask students to calculate an average of the additional time it took to complete the Touch Track during the fifth combined distraction (simulating texting with the calculator). Using their average time, ask students to calculate how far their car would travel during that time going 55 mph.
- c. Ask students to review the class list of distracted driving examples as well as the four types of distracted driving then synthesize this information by writing a one-sentence definition of distracted driving. In a 2011 report, the Governors Highway Safety Association stated a “distraction occurs when a driver voluntarily diverts attention to something not related to driving that uses the driver’s eyes, ears, or hands.” The National Highway Traffic Safety Administration defines distracted driving as “any activity that could divert a person’s attention away from the primary task of driving. *All* distractions endanger driver, passenger, and bystander safety”.



“Driver” - My name: _____ Date _____

Distraction	Time to complete Touch Track #2			
	Trial 1 – time (seconds)	Trial 1 – time (seconds)	Trial 1 – time (seconds)	Average time (seconds)
Without distractions				
With distractions				
1. Visual				
2. Auditory				
3. Manual				
4. Cognitive				
5. All the Above				

My Distractor's name: _____ My Timer's name: _____

My Checker's name: _____

After the Activity: Write your answers to the following questions on the back of this sheet.

1. Rank the difficulty of the sensory distractions from easiest to hardest. Include the average times.

For extra credit: Calculate on average the additional time necessary to complete the Touch Track while completing the All the Above distraction. Once you have this time difference, calculate how far your car would travel during that time going 55 mph.

2. After reviewing your class list of distracted driving examples as well as the four types of distracted driving, synthesize this information by writing a one-sentence definition of distracted driving.

Driving Distractions: Categories and descriptions

Driving Distractions	Directions for administering distractions
1. Visual = looking at something other than the road	Inform the “driver” that as they perform the Touch Track you will pick up and show them various items. <u>They must look at the item and identify it by name.</u> You will show them a different item every 5 or 7 seconds until they complete the maze. Possible items: playing cards, textbook photos, magazine photos, calculator, hand mirror
2. Auditory = hearing something not related to driving	Inform the “driver” that as they perform the Touch Track you will read them <u>short</u> sentences or <u>parts of sentences</u> from a textbook or a novel. They must repeat back to what you read to them.
3. Manual = manipulating something other than the wheel	Inform the “driver” that as they perform the Touch Track they will <u>remove uniquely shaped items</u> from one bowl and place them in a second bowl. For example, you may ask them to remove the pretzels from a bowl filled with a mixture of nuts, pretzels, and M&Ms.
4. Cognitive = thinking about something other than driving	Inform the “driver” that as they perform the Touch Track you will ask them to <u>mentally calculate</u> a long math problem.

Distraction #4 Cognitive: Mental Math addition problems (cut into strips and place in a zip-lock baggie)

$$1 + 9 + 3 + 8 + 2 + 5 + 6 = ? \quad (\text{answer: } 34)$$

$$2 + 10 + 6 + 3 + 2 + 7 + 8 + 2 = ? \quad (\text{answer: } 40)$$

$$3 + 3 + 2 + 13 + 3 + 100 + 2 = ? \quad (\text{answer: } 126)$$

$$4 + 10 + 7 + 3 + 10 + 50 + 2 = ? \quad (\text{answer: } 86)$$

$$5 + 3 + 5 + 2 + 3 + 3 + 2 = ? \quad (\text{answer: } 23)$$

$$6 + 15 + 3 + 3 + 3 + 10 + 2 = ? \quad (\text{answer: } 42)$$

$$7 + 4 + 5 + 1 + 2 + 6 + 7 = ? \quad (\text{answer: } 32)$$

$$8 + 2 + 10 + 6 + 5 + 5 + 7 = ? \quad (\text{answer: } 43)$$

$$9 + 9 + 9 + 10 + 10 + 10 + 9 = ? \quad (\text{answer: } 66)$$

Optional “All the Above” Distraction: Typing numbers into a calculator while completing Touch Track #2

Teacher preparation

1. Cut math problems into strips and place in a small zip-lock bag.
2. Acquire small calculators. Calculators should be small enough for students to hold with one hand.

Driving distractions	Directions for administering distractions
5. All the Above (Visual, Auditory, Manual, and Cognitive)	Inform the “driver” that as they complete the Touch Track with one hand you will ask them to hold a small calculator in the other hand so they may <u>input a long math problem into the calculator as you read it to them.</u> You will check their answer at the end.

Directions: Distractors should read one of the following math problems to the drivers and instruct them to input the problem into the calculator as they perform the Touch Track. Checker team members will check the Driver’s answers for accuracy.

Calculator Math problems – cut into strips and place in a small zip-lock bag.

$$1 \times 9 + 3 + 8 \div 2 + 25 + 6 = ? \quad (\text{answer: } 41)$$

$$2 + 10 - 6 \div 3 \times 2 + 8 + 8 \times 2 = ? \quad (\text{answer: } 40)$$

$$3 \times 3 + 2 + 13 \div 3 + 100 + 2 = ? \quad (\text{answer: } 110)$$

$$4 + 10 - 7 + 3 \times 10 + 50 \div 2 = ? \quad (\text{answer: } 75)$$

$$5 \times 3 + 5 \div 2 + 33 - 3 \times 2 = ? \quad (\text{answer: } 80)$$

$$6 + 15 \div 3 + 3 \times 9 + 10 \div 2 = ? \quad (\text{answer: } 50)$$

$$7 \times 4 + 5 + 1 + 2 \div 6 \times 7 = ? \quad (\text{answer: } 42)$$

$$8 \div 2 + 10 + 6 + 5 \div 5 \times 7 = ? \quad (\text{answer: } 35)$$

$$9 \times 9 + 9 + 10 \div 10 + 10 + 9 = ? \quad (\text{answer: } 29)$$